

#68-20-CIPAF

Technology

Machinery of territorial impact

### Onion Postharvest System



Family Agriculture Research Center (CIPAF)

Institute of Family Agriculture (IPAF), Pampeana Region

Laura Febo

Sergio Justianovich

Battista, Eburne

Ocampo, Fernando<br>Haag,

María Julieta

Marozzi, Sofía

D'amico, Juan Pablo

Technological Research and Development Institute for Family Agriculture in Pampeana Region of Argentina (IPAF) (INTA-IPAF)

National University of La Plata (UNLP), School of Arts, Industrial Design Program<br>

Agricultural Experiment Station: Hilario Ascasubi

#family agriculture | #onion | #post-harvest | #workstation | #quality

At present, onions are cured in stacks in the postharvest system. The problems or labor risks defined by the International Labor Organization (ILO) arise during this stage and subsequently: clipping roots and leaves, sorting, bagging and marketing.

Interviews with farmers of the Buenos Aires valley in Argentina state that work starts at 5 a.m., with clipping and sorting tasks. They work outdoors during the winter, facing respiratory

conditions due to the dust generated by this activity, conjunctivitis from the onion acid, and joint pain in hands and body due to the poor working postures.

Additionally, small family farmers have no possibility to access intermediate solutions between manual and mechanical post-harvesting equipment. The quality of manual clipping is better than mechanical clipping, but in turn, the latter produces higher yields. No intermediate mechanization solution exists.

According to the demands expressed by family farmers and jointly with the Hilario Ascasubi Agricultural Experiment Station of INTA (as per the studies commission agreement between the Industrial Design Program of the School of Arts of the National University of La Plata (UNLP) and INTA) a number of proposals were developed to improve the working conditions mentioned above. The design proposals were gathered in several meetings from family farmers and SMEs.

Metal mechanic industries in the Valley of the Colorado River in the Buenos Aires province designed a workstation for onion postharvest.

In Argentina, onion crops span approximately 30 thousand hectares, accounting for 1% of the overall planted area worldwide. It is one of the most extensively grown vegetables in Argentina and ranks third in volume, after beans and potatoes. The area planted with onions has increased by 70% in the last ten years. They are stored and marketed in bulk, far from consumption areas.

It is mainly targeted at the fresh produce market. Industry imports small quantities (dehydrated, pickles).

Ninety-eight percent of the onions marketed in the Central Market of Buenos Aires comes from the rest of the country and Buenos Aires, contributing with almost 44% of the volume sold in that market. Between 30 and 50% of the volume produced locally is exported to Brazil (with annual variations).

1. Manually operated (does not require an external power source).
2. Easy to transport. Size and weight enable transportation on a trailer for individual and/or collective transportation.
3. It includes 9 workstations (6 for clipping and 3 for bagging).
4. It enables to group and systematize the following tasks (organize in time and space):
  - a) positioning the Big Bag (with mechanical assistance) reducing loading efforts
  - b) easy access to onions through the table
  - c) clipping on the table, in a comfortable position, protected from the elements
  - d) space for residues and clipped onions on the sorter
  - e) classification according to size using gravity
  - f) bag filling using gravity
  - g) Includes seats designed according to standardized measures and accessible commands to perform repetitive operations (bag filling)

5. Working time. 17 minutes for 500 kg of onions (sorting, fragmenting – 20 kg bags). 80 Big Bags per 1 ha implies 2 days of work for 9 operators, assuming the same clipping times in effect at present.
6. Environmental advantages (comparison between inputs required in the stacking system vs. the Big Bag system). The reusable Big Bag lasts for 4 years and offsets the environmental impact caused by the disposal of bags, threads and textiles during the postharvest (onion curing stage).
7. Commercial advantage. The location of the station on main roads or roads broadens commercial possibilities. It removes the climate variable from the marketing stage.
8. Agronomic management advantages. Clearing the lot after the harvest enables rational weed control (mechanical and/or chemical); growing crops in tunnels, defining two crops per year on the same surface area; concentrating waste in the main roads or roads of the lots for composting purposes; reduction of soil compaction.
9. Advantages on the crop quality, since the station reduces movements to one movement required to transfer the onion in between sites and different containers, compared with the traditional 6 movements in the field process reported by farmers.
10. Finally, it is an additional tool for family farmers.

The technology is in the advanced development phase. The first experimental prototype has been completed to perform field tests.

Once the prototype is validated, it will be adjusted according to the indications that arise while the product is used in the field. The plan is to manufacture several units for testing by different farmer organizations that work in the postharvest of onions.

Open Design (INTA-UNLP)